PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference W 5874-166 LB	FOR FURTHER ACTION	See Form PCT/PEA/416
International application No. PCT/EP 03/13227	International filing date (day/month/year) 25.11.2003	Priority date (day/month/year) 20.12.2002

International Patent Classification (IPC) or national classification and IPC
G06T11/00

Applicant
TELEFONAKTIEBOLAGET L M ERICSSON (PUBL) ET AL.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I   Basis of the opinion

   ☐ Box No. II   Priority

   ☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   ☐ Box No. IV   Lack of unity of invention

   ☒ Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   ☐ Box No. VI   Certain documents cited

   ☐ Box No. VII   Certain defects in the international application

   ☐ Box No. VIII   Certain observations on the international application

Date of submission of the demand 02.07.2004	Date of completion of this report 31.03.2005
Name and mailing address of the International preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Perez Molina, E Telephone No. +31 70 340-2286

Box No. I   Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

       ☐ international search (under Rules 12.3 and 23.1(b))
       ☐ publication of the international application (under Rule 12.4)
       ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-13   as originally filed

Claims, Numbers

25, 26   as originally filed

1-24   received on 25.02.2005 with letter of 24.02.2005

Drawings, Sheets

1/7-7/7   as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☒ The amendments have resulted in the cancellation of:
       ☐ the description, pages
       ☒ the claims, Nos. 26
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
       ☐ the description, pages
       ☐ the claims, Nos.
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

   * If item 4 applies, some or all of these sheets may be marked "superseded."

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-25
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-25
Industrial applicability (IA)	Yes:	Claims	1-25
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V
Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

Reference is made to the following document/s/:
D1: US 2002/140706 A1 (MULLIS ROBERT H ET AL) 3 October 2002 (2002-10-03)
D2: NVIDIA CORP.: "hrra: High-resolution antialiasing through multisampling"
TECHNICAL BRIEF-NVIDIA CORP., [Online] 2002, pages 1-8, XP002246880
Retrieved from the Internet: URL:www.nvidia.com> [retrieved on 2003-07-08]

1   Inventive step

The present application does not meet the criteria of Article 33(1) PCT, because the
subject-matter of claims 1, 10, 17 and 24 does not involve an inventive step in the sense of
Article 33(3) PCT for the following reasons:

The document D1, which is regarded as being the closest prior art to the subject-matter of
claim 1, 10, 17 and 24, discloses (see page 5, paragraph 35 to 39 and figure 9) a
sampling pattern to be used in an antialiasing circuit. The sample points are arranged
asymmetrically to improve the antialising effect.
In order to improve the computation performance, the man skill in the art would use
sample sharing techniques as taught by document D2 (see page 2, line 28 to 32).
The direct application of the teaching of D2, namely sharing technique to improved
computation performance in an antialiasing system, to the sampling pattern proposed by
document D1 in figure 9 would lead to a sampling pattern with the same features that the
proposed in present claims 1, 10, 17 and 24.

2   Clarity

Independent claim 1 is unclear because it defines the position of the sample points "at the
edges of one or more than one mirror plane within the array of pixels". The position of the
mirror plane is not determined or specified but in order to achieve the computation

performance neighboring pixels should be shared and therefore the sample point must be on the edges of the pixels. Thus, claim 1 does not meet the requirements of Article 6 PCT.

CLAIMS

1. Use of a sampling pattern covering an array of pixels in an anti-aliasing system, where each pixel has a pattern of sample points at the edges of one or more than 5 one mirror plane within the array of pixels, **characterized in that**

the sample point pattern of each pixel is a mirror image of, and different from, the sample point pattern of a directly neighboring pixel.

10

2. The use according to claim 1, wherein the mirror planes are located on the edges of the pixel.

3. The use according to claim 1 or 2, wherein the 15 sample point pattern has one sample point per pixel mirror plane, said sample point being located at a distance from the corner of the pixel.

4. The use according to any of claim 1 to 3, wherein 20 the (x, y) coordinates of the sample points for a pixel are related according to (0, a), (a, 1), (b, 0), and (1, b).

5. The use according to any of claim 1 to 3, wherein the (x, y) coordinates of the sample points for a pixel are 25 related according to (0, b), (a, 0), (b, 1), and (1, a).

6. The use according to claims 4 or 5, wherein the sum "a+b" is in the range 0,5 - 1,5.

30 7. The use according to any of claims 4-6, wherein a = 1/3 and b = 2/3.

8. The use according to any of claims 1-7, wherein the sampling point pattern is used for processing a still 35 image.

AMENDED SHEET

9. The use according to any of claims 1-7, wherein the sampling point pattern is used for processing a video sequence.

5

10. A method for creating a sampling pattern covering an array of pixels for use in an anti-aliasing system, where each pixel has a pattern of sample points at the edges of the pixel, **characterized by**

10   defining the sample point pattern of each pixel so that it is a mirror image of, and different from, the sample point pattern of a directly neighboring pixel

11. The method according to claim 10, wherein the

15   pattern has one sample point per pixel edge, the method comprising defining said sample point at a distance from the corner of the pixel.

12. The method according to claim 10 or 11, wherein

20   the (x, y) coordinates of the sample points for a pixel are related according to (0, a), (a, 1), (b, 0), and (1, b).

13. The method according to claim 10 or 11, wherein the (x, y) coordinates of the sample points for a pixel are

25   related according to (0, b), (a, 0), (b, 1), and (1, a).

14. The method according to claims 12 or 13, wherein the sum "a+b" is in the range 0,5 - 1,5.

30   15. The method according to any of claims 12 to 14, wherein a = 1/3 and b = 2/3.

16. An anti aliased image created by processing an image according to any of the steps 10-15

35

AMENDED SHEET

3

17. An anti-aliasing system comprising a GPU, wherein the GPU is adapted to define a pattern of sample points at the edges of a pixel, **characterized in that**

the GPU is adapted to define the sample point pattern

5   of each pixel so that it is a mirror image of, and different from, the sample point pattern of a directly neighboring pixel

18. The system according to claim 17, wherein the GPU

10   is implemented in hardware.

19. The system according to claim 17, wherein the GPU is implemented in software.

15   20. The system according to any of claims 17 to 19, wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, a), (a, 1), (b, 0), and (1, b).

20   21. The system according to any of claims 17 to 19, wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, b), (a, 0), (b, 1), and (1, a).

25   22. The system according to claims 20 or 21, wherein the sum "a+b" is in the range 0,5 – 1,5.

23. The system according to any of claims 20 to 22, wherein a = 1/3 and b = 2/3.

30

24. A computer program product directly loadable into an internal memory associated with a CPU, said CPU being operatively coupled to a GPU for defining a pattern of sample points at the edges of a pixel, comprising program

35   code for

AMENDED SHEET

4

defining the sample point pattern of each pixel so that it is a mirror image of, and different from, the sample point pattern of a directly neighboring pixel

5   25. A computer program product as defined in claim 24, embodied on a computer-readable medium.

AMENDED SHEET